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Dimorphothynnus (Hymenoptera: Thynnidae: Rhagigasterini) newly recorded from the Northern Territory, Australia

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ABSTRACT

The predominantly southern Australian genus *Dimorphothynnus* Turner is newly recorded from the Northern Territory, and two new species, *D. fulvicrus* and *D. nigricrus*, are described. Both species are relatively small in size, and only known from male individuals. A key to males of 15 species of *Dimorphothynnus* is given; that is, all but two of the known species. A key to females of eight species of *Dimorphothynnus* is given under the assumption of species fidelity of mates. Two new combinatins are made – *Rhagigaster haemorrhoidalis* Guérin is transferred to *Rhytidothynnus*, and *R. obtusus* Smith is transferred to *Dimorphothynnus*.

KEYWORDS: Northern Australia, Thynnidae, Rhagigasterinini, *Dimorphothynnus*.

INTRODUCTION

The genus *Enteles* was erected by Westwood (1844). However, this name was preoccupied by the weevil genus *Enteles* Schoenherr (1833), and so in 1910 Turner proposed the replacement name *Dimorphothynnus*. This genus has never been revised and the most recent key to species is over a century old (Turner 1907).

Males are very similar to those of *Rhagigaster* Guérin, and the related genera *Rhytidothynnus* Brown and *Umbothynnus* Brown. The males of these genera are distinguished by a long, cylindrical metasoma with strong constrictions between the metasomal segments. However, those of *Dimorphothynnus* have the clypeus with an inverted V-shaped carina which is not sharply defined (Fig. 1), the propodeum has a transverse carina separating the dorsal and posterior surfaces, the epipygium is flat with the apical margin straight or almost so (Fig. 2), and the genitalia have the cuspides long with the outer surface denticulate apically. Females however, are unique within the tribe in that metasomal tergite 2 is transversely multicarinate. The latter character is more typical of the tribe Thynnini, where it occurs in most genera (Turner 1910).

As in all Thynninae the sexes of *Dimorphothynnus* are completely dimorphic; males are typical winged wasps, while females are wingless and strongly modified for burrowing in soil. This makes the association of sexes on morphological grounds impossible. Matching the sexes is further complicated by the prevalence of miscoupling (Brown 1993, 2001) in the subfamily. Miscoupling occurs when two different species couple, and thus there is no guarantee that pairs collected *in copula* are actually the same species. This makes it difficult to compare species if the types are of different gender, as discussed for the genus by Given (1959).

Nothing is known of the biology of *Dimorphothynnus*. As with most species of Australian Thynninae, they are presumed to be parasites of scarab larvae (Burrell 1935; Given 1953; Ridsdill Smith 1970), but this is based on fewer than 20 records. Adults have a preference for feeding on the nectar of myrtaceous flowers but they are attracted to other flowers as well as insect exudates. This biological information was summarised by Brown (2005).

There are now 15 described species of *Dimorphothynnus* including the two new species described here. Most are restricted to coastal regions of southern Australia except *D. barnardi* (Turner) and *D. integer* (Fabricius) from tropical Queensland as well as the two Northern Territory species described here.

Fig. 1. *Dimorphothynnus nigricrus*, male: head. Scale line = 0.1 mm.

Fig. 2. *Dimorphothynnus fulvicrus*, male: epipygium. Scale line = 0.05 mm.

Terminology follows Snodgrass (1941), Brown (1997a, b) and Naumann (1991). Relative terms relating to microsculpture are interpreted as follows: sparsely punctate = punctures greater than two puncture-diameters apart; punctate = punctures at most two puncture-diameters apart, but never confluent; closely punctate = punctures almost confluent; rugosely punctate = punctures partially confluent; finely punctate = punctures small and shallow; coarsely punctate = punctures large and deep; obscurely punctate = punctures small, sparse, shallow and only visible at certain angles.

Abbreviations. Morphological characters: T1–7, metasomal tergites 1–7; S1–8, metasomal sternites 1–8. Specimen repositories: ANIC, Australian National Insect Collection, CSIRO, Canberra; MNG, Museo Civicodi Storia Naturale di Genova, Genoa, Italy; NTM, Museum and Art Gallery of the Northern Territory (formerly Northern Territory Museum), Darwin; OUM, Oxford University Museum, Oxford, United Kingdom.

SYSTEMATICS

Dimorphothynnus Turner, 1910

Enteles Westwood, 1844. Gender masculine. Type species, by original designation, *Enteles bicolor* Westwood, 1844. Recent, King George's Sound, Western Australia. Preoccupied by *Enteles* Schoenherr, 1833 (Insecta: Coleoptera).

Dimorphothynnus Turner, 1910. Replacement name for *Enteles* Westwood (1844). Gender masculine.

As explained above, *Dimorphothynnus* is a replacement name for the preoccupied *Enteles* Westwood (1844). Dalla Torre (1897: 100) used *Enteles* as a subgenus of *Thynnus* and Ashmead (1899: 50,52, 1903: 103) inadvertently misspelt *Enteles* as *Entelus*.

I have examined the holotype of *Enteles bicolor* Westwood, 1844, which is deposited in the OUM.

Dimorphothynnus fulvicrus sp. nov.

(Figs 2, 3, 5, 7)

Material examined. Holotype – NTM I.6201, ♂, Northern Territory, Adelaide River, 13°14'S, 131°06'E, Adelaide River, 20 December 1995, G.R. Brown & G.M. Dally. Paratypes – ANIC (not registered), 1, ♂, same data as holotype; NTM I.6205, 1, ♂, same data as holotype; NTM I.6202, 1, ♂, 13°14'S, 131°06'E, Adelaide River, 5 November 1996, G.R. Brown.

Description of male. Body (Figs 2, 3) length 12 mm; fore wing 8 mm; hind wing 6 mm.

Clypeus with obscure inverted V-shaped carina which is flattened and not sharply defined, rugosely punctate between branches of carina, finely rugosely punctate laterally; frons with short, flat, with V-shaped carina above antennal insertion, transversely carinate below mid-ocellus, rugosely punctate; vertex and gena rugosely punctate.

Pronotum rugosely punctate, dorsum transversely rugose, anterior margin sharply carinate; mesoscutum coarsely transversely rugosely punctate; mesoscutellum coarsely rugosely punctate; metanotum rugosely punctate; propodeum closely punctate becoming transversely rugosely punctate on posterior surface, dorsal and posterior surfaces delineated by carina; mesopleuron coarsely rugosely punctate dorsally becoming finely punctate ventrally; fore coxae small, conical, closely punctate.

Metasoma with anterior groove on T2–5 and S2–5 scrobiculate; tergites closely and finely punctate, punctures sparser posterolaterally and coarser on T7; epipygium (Fig. 2) rounded apically with narrow semi-membranous apical margin; sternites closely punctate, less so on disc of S2–6; S1 weakly medially raised; hypopygium subparallel basally becoming sinusoidal distally without prominent lateral lobes or spines thence produced into long recurved apical spine.

Genitalia (Fig. 7): parameres (in profile) long and narrow, ventral margin evenly concavely curved over most of length, dorsal margin subparallel over basal 2/3 then abruptly converging (and slightly concave) with ventral margin over most of length, apex narrowly rounded and slightly

Fig. 3. *Dimorphothynnus fulvicrus*, male: habitus. Scale line = 1 mm.

upturned; aedeagus (Figs 5,7) short, subtriangular medially with highly modified valves sheathing the remainder of the aedeagus basally; cuspides large, subtriangular (viewed dorsally), outer margin serrated with small basally directed teeth, inner margin straight with flat vertical inner surface; digiti small, inconspicuous and knob-like with erect cluster of setae.

Colour. Black; tegulae and legs (except fore coxae) orange; setae white, and forming posterior or ventral bands on most metasomal segments especially laterally and ventrally; wings hyaline, veins black becoming orange basally.

Distribution. Only known from above the northern bank of Adelaide River in the township of Adelaide River, Northern Territory.

Remarks. This species, one of the smallest in the genus, can be distinguished from all the other species of *Dimorphothynnus* by the combination of orange legs, hyaline wings and a black metasoma. The setal banding on the metasoma suggests a relationship with *D. integer* from northern Queensland, but *D. integer* has a distinctive mesoscutellum which is almost impunctate and higher posteriorly with a distinct flat posterior surface that is delineated dorsally by a transverse carina. The new species differs from *D. obtusus* by the presence of setal bands on the metasoma. The shape of the sheathing valve at the base of the aedeagus (Fig. 5) also distinguishes this species from *D. nigricrus* (Fig. 6).

Etymology. This species name is derived from Latin and is a reference to leg colour. It is intended as a noun in apposition.

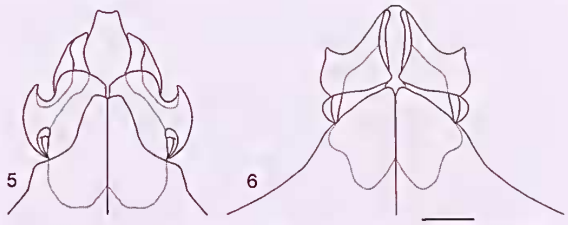
Dimorphothynnus nigricrus sp. nov.

(Figs 1, 4, 6, 8)

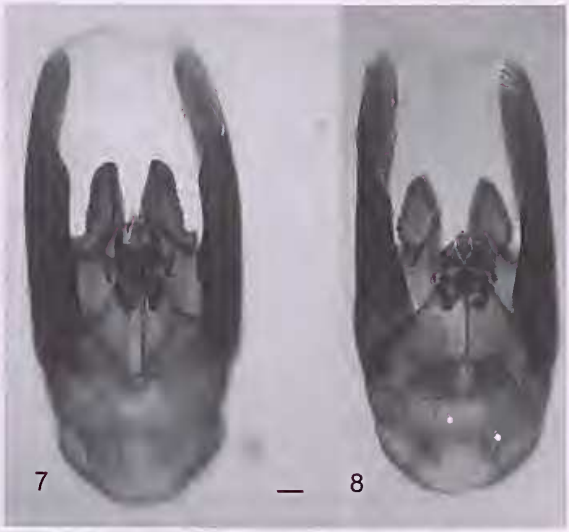
Material examined. Holotype – NTM I.6203, ♂, campsite near Oenpelli reservoir, Northern Territory, 12°23'S, 133°06'E, uv light, 27 November 1996, G.R. Brown & J. Purdie.

Description of male. Body (Fig. 4) length 14 mm; fore wing 10 mm; hind wing 7 mm.

Fig. 4. *Dimorphothynnus nigricrus*, male: habitus. Scale line = 1 mm.



Figs 5, 6. *Dimorphothynnus* species, aedeagi (and apex of basiparameres), dorsal view: 5, *Dimorphothynnus fulvicrus*; 6, *Dimorphothynnus nigricrus*. Scale line = 0.1 mm.



Figs 7, 8. *Dimorphothynnus* species, male genitalia, dorsal view: 7, *Dimorphothynnus fulvicrus*; 8, *Dimorphothynnus nigricrus*. Scale line = 0.1 mm.

Clypeus (Fig. 1) with obscure inverted V-shaped carina which is flattened and not sharply defined, rugosely punctate between branches of carina, finely rugosely punctate laterally; frons with short, flat, V-shaped carina above antennal insertions, transversely carinate below mid ocellus, rugosely punctate; vertex and gena closely to rugosely punctate.

Pronotum rugosely punctate, dorsum transversely rugose, anterior margin sharply carinate; mesoscutum coarsely transversely rugosely punctate; mesoscutellum coarsely and closely punctate; metanotum rugosely punctate; propodeum closely punctate, dorsal and posterior surfaces delineated by obscure carina; mesopleuron coarsely rugosely punctate dorsally becoming finely and closely punctate ventrally; fore coxae small, conical, closely punctate.

Metasoma with anterior groove on T2–5 and S2–5 scrobiculate; tergites closely punctate, punctures sparser posterolaterally on T2–5 and coarser on T7; epipygium rounded apically without narrow semi-membranous apical margin; sternites closely and deeply punctate; S1 weakly medially raised; hypopygium subparallel basally becoming sinusoidal distally without prominent lateral lobes or spines thence produced into long recurved apical spine.

Genitalia (Fig. 8) with parameres (in profile) long and narrow, margins almost straight, ventral margin slightly sinusoidal, dorsal margin converging with ventral over most of length, apex narrowly rounded; aedeagus (Figs 6, 8) short, subtriangular medially with highly modified valves sheathing remainder of the aedeagus basally; cuspides large, subtriangular (viewed dorsally) with ventral lobe arising from lateral margin, outer margin (viewed dorsally) serrated with small basally directed teeth, inner margin straight with flat vertical inner surface; digiti apparently absent.

Colour. Black; setae white, and forming posterior or ventral bands on most metasomal segments especially laterally and ventrally; wings hyaline, veins black.

Distribution. *Dimorphothynnus nigricrus* is only known from the vicinity of Oenpelli, Northern Territory, from a creek flat downstream from Oenpelli reservoir.

Remarks. This species is similar to *D. fulvicrus* in that both are smaller than most other species in the genus and have the tergites uniformly and closely punctate, but *D. fulvicrus* has orange legs rather than black legs. It is also distinguished from *D. integer* and *D. obtusus* as discussed for *D. fulvicrus* above.

Etymology. This species name is derived from Latin and is a reference to leg colour. It is intended as a noun in apposition.

KEYS TO THE SPECIES OF *DIMORPHOTHYNNUS*

The majority of type specimens within *Dimorphothynnus* (as well as the subfamily) are male. However, two species, *D. bicolor* and *D. fimbriatus* (Smith), were described from the female only. Unfortunately both of these are a part of a complex of species that also includes *D. apicalis* (Smith), a species misidentified as *D. haemorrhoidalis* (Guérin) by Westwood (1844a), Turner (1907, 1910) and Given (1959), as well as several undescribed species. This species complex was discussed by Given (1959), who was able to demonstrate that pairs collected 'in copula' were not necessarily the same species, and as such the identity of the males of *D. bicolor* and *D. fimbriatus* must be considered tentative.

Rhagigaster haemorrhoidalis Guérin does not belong to this genus and is here transferred to *Rhytidothynnus* Brown based on an examination of the holotype in MNG. Conversely, *Rhagigaster obtusus* Smith is a species of *Dimorphothynnus* because the genitalia completely match those of the type species of *Dimorphothynnus*. So the correct combinations for these two species are *Rhytidothynnus haemorrhoidalis* (Guérin) comb. nov. and *Dimorphothynnus obtusus* (Smith) comb. nov.

The females of *Dimorphothynnus barnardi* (Smith), *D. conjugatus*, *D. testaceipes*, *D. truncicutis* and the two new species described here, are unknown. However, it is interesting to note that Turner (1907) had a male and a female in front of him when he described *D. barnardi* but the female was damaged and incomplete and he therefore did not describe it. The original description of *D. barnardi* indicates that the clypeal carina is in the form of an inverted Y-shape and enclosing a polished almost impunctate area, but gives no mention of a transverse propodeal carina. The description of the clypeal carina excludes this species from this genus (as would the absence of a propodeal carina). It is more likely that it is a species of *Rhytidothynnus*. While the type has not been examined, I have seen a specimen from Pine Creek near Bundaberg, Queensland, in ANIC that fits the description of this species and which is a species of *Rhytidothynnus*. This specimen was collected about 260 km southeast of the type locality, Duaringa. Its inclusion in the key is based on the original description (Turner, 1907), and its correct placement is dependent on an examination of the holotype which is the only known specimen.

Similarly, the female of *D. deceptor* (Smith) was not considered to be a species of *Dimorphothynnus* by Turner (1907), and is therefore not included in the key.

Male (winged)

1 Wings fulvous; legs black [only known from the types from Geraldton, WA] ..... *D. deceptor* (Smith)
– Wings hyaline, fuscous or black (although veins may be orange); legs black or orange 2

2(1) Clypeus with sharply defined inverted Y-shaped carina, branches enclosing polished triangular area [Qld] ..... *D. barnardi* (Turner)
– Clypeus with inverted V-shaped carina, carina not sharply defined, not enclosing a large or polished triangular area 3

3(2) Metasoma black (if lightly testaceous as in *D. testaceipes*, then wings black) 4
– Metasoma at least partially ferruginous 10

4(3) Wings hyaline to weakly infuscate 5
– Wings black 8

5(4) Mesoscutellum almost impunctate, vertically truncate posteriorly with carina sharply delineating dorsal and posterior surfaces [Qld] ..... *D. integer* (Fabricius)
– Mesoscutellum punctate to rugosely punctate, without distinct posterior surface clearly delineated from dorsal surfaces 6

6(5) Tergites closely and uniformly punctate, posterior margin of tergites (weakly so medially in *D. fulvicrus* and *D. nigricrus*) and sternites and ventral margins of pleurites with dense fringe of white setae 7
– Tergites punctate to closely punctate, punctures variable in size and spacing, tergites, sternites and pleurites not fringed with white setae [NSW, Vic, SA] ..... *D. obtusus* (Smith) comb. nov.

7(8) Legs orange [NT] ..... *D. fulvicrus* sp. nov.
– Legs brown to black [NT] ..... *D. nigricrus* sp. nov.

8(4) Epipygium punctuate, with punctures longitudinally aligned; legs dark; mesoscutellum truncate posteriorly; mesopleura deeply and rugosely punctate [Qld, NSW, Vic, SA] ..... *D. truncisculus* Turner
– Epipygium longitudinally multicarinate or irregularly longitudinally multistriate; legs orange; mesoscutellum narrowly rounded posteriorly; mesopleura punctate 9

9(8) Metasoma lightly testaceous [NSW, Vic, SA] ..... *D. testaceipes* (Turner)
– Metasoma black [NSW] ..... *D. morio* (Westwood)

10(3) Metasoma entirely ferruginous [Qld, NSW] ..... *D. dimidiatus* (Smith)
– Metasoma with only apical 2 segments ferruginous 11

11(10) Wings dark; pronotum transversely carinate [Qld] ..... *D. conjugatus* (Turner)
– Wings hyaline; pronotum punctate to rugose 12

12(11) Mesopleurae red [WA]..... *D. similimus* (Smith)
– Mesopleurae black 13

13(12) Fore coxae with deep, large, longitudinal, smooth and polished cavity on the inner ventral surface that is delineated by a sharp carina WA] ..... *D. bicolor* (Westwood)
– Fore coxae if depressed or partially concave, not deeply so and not margined by a carina..... 14

14(13) Prosternum (and adjacent areas of fore coxae) concave , concavity polished and sparsely punctuate [WA] ..... *D. fimbriatus* (Smith)
– Prosternum not concave, punctuation more uniform [WA]..... *D. apicalis* (Smith)

Female (wingless)

1 Pygidium notched ..... *D. apicalis* (Smith)
– Pygidium not notched 2

2(1) Dorsum of T1 finely transversely carinate, not punctate; head medially depressed..... *D. integer* (Fabricius)
– T1 not transversely carinate; head not medially depressed 3

3(2) Posterior angles of head weakly excavate..... *D. bicolor* (Westwood)
– Posterior angles of head not excavate 4

4(3) Apex of metasoma ferruginous ..... *D. dimidiatus* (Smith)
– Metasoma concolorous 5

5(4) Head and body dark brown or black 6
– Head and metasoma black, mesosoma ferruginous 7

6(5) T3 with transverse carinae mostly restricted to anterior half of sclerite..... *D. obtusus* (Smith) comb. nov.
– T3 with transverse carinae more evenly distributed on sclerite..... *D. morio* (Westwood)

7(5) T1 transversely carinate (in addition to apical margin and weak preapical carina); apex of metasoma with a long brush of setae laterad to pygidium ..... *D. fimbriatus* (Smith)
– T1 not transversely carinate (other than apical margin and weak preapical carina); apex of metasoma without long brush of setae..... *D. similimus* (Smith)

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